

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
23 December 2004 (23.12.2004)

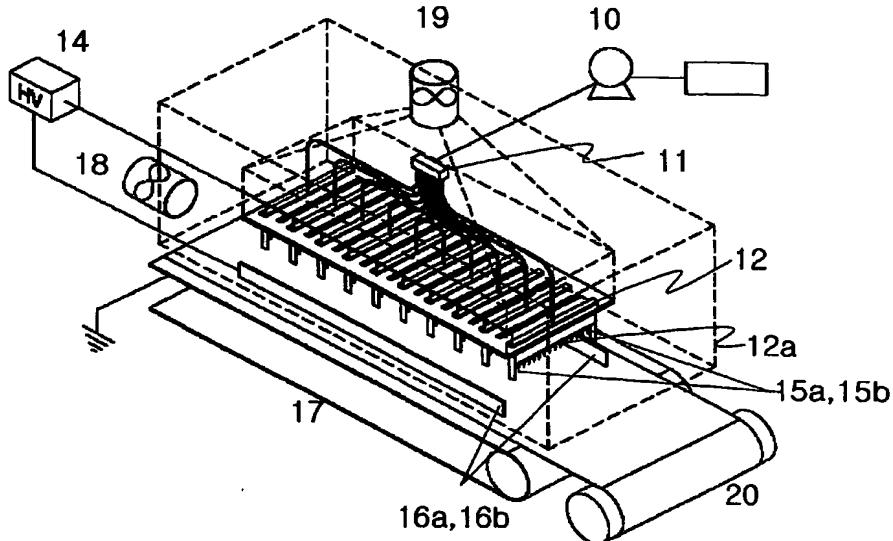
PCT

(10) International Publication Number
WO 2004/112183 A1

- (51) International Patent Classification⁷: **H01M 10/40**
- (21) International Application Number:
PCT/KR2004/000750
- (22) International Filing Date: 31 March 2004 (31.03.2004)
- (25) Filing Language: Korean
- (26) Publication Language: English
- (30) Priority Data:
10-2003-0039239 17 June 2003 (17.06.2003) KR
10-2003-0093184 18 December 2003 (18.12.2003) KR
- (71) Applicant (for all designated States except US):
SAMSHIN CREATION CO., LTD. [KR/KR]; 31-28 Cheongdam2-dong, Gangnam-gu, Seoul 135-950 (KR).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **CHUN, Suk-Won [KR/KR]; 106-307 Saetbyeolmaeul Life Apt., Bundang-dong, Bundang-gu, Seongnam-si, Gyeonggi-do 463-748 (KR). PARK, Jong-Su [KR/KR]; 108-1303 Hansin Apt., Cheongnyangni 1-dong, Dongdaemun-gu,**
- Seoul 130-775 (KR). JO, Seong-Mu [KR/KR]; 201-308 Anam Apt., Myeongnyun-dong 2-ga, Jongno-gu, Seoul 110-767 (KR). LEE, Hwa-Seop [KR/KR]; 103-601 Samsung Cheongdam Gongwon Apt., Cheongdam-dong, Gangnam-gu, Seoul 135-952 (KR).
- (74) Agents: **LEE, Sang-Yong et al.; 4F, Byukcheon Bldg., 1597-5 Seocho-dong, Seocho-gu, Seoul 137-876 (KR).**
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,

[Continued on next page]

(54) Title: A COMPLEX MEMBRANE FOR ELECTROCHEMICAL DEVICE, MANUFACTURING METHOD AND ELECTROCHEMICAL DEVICE HAVING THE SAME



WO 2004/112183 A1

(57) Abstract: A complex membrane for an electrochemical device such as a lithium secondary battery, its manufacturing method, and an electrochemical device having the complex membrane are disclosed. The complex membrane includes a micro-porous polyolefin membrane, and a web-phase porous membrane united to at least one side of the micro-porous polyolefin membrane and composed of nano-fibers. Since the complex membrane is capable of absorbing an electrolyte uniformly, it greatly improves performance of a battery when being used for an electrochemical device. In addition, owing to excellent mechanical strength and good binding capacity to an electrode, it helps to increase a process rate for manufacturing the battery.



GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*